UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,641	05/27/2005	Pierluigi D'Alessandro	853563.445USPC	4712

38106   7590   06/10/2009
SEED INTELLECTUAL PROPERTY LAW GROUP PLLC
701 FIFTH AVENUE, SUITE 5400
SEATTLE, WA 98104-7092

EXAMINER
SHAH, TANMAY K

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
06/10/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/10/09*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) *9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   A request for continued examination under 37 CFR 1.114, including the

fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection.

Since this application is eligible for continued examination under 37 CFR 1.114,

and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the

previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 4/20/09 has been entered.

Response to Arguments

2.   Applicant's arguments with respect to claims 1 - 20 have been considered

but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

4.   Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

Regarding claim 2, applicant refers to first value as being a ratio between cross

correlation of said I and Q components of said I and Q components of the

incoming I/Q modulated signal and a mean value of said I and Q components.

Applicant also describes second and third value. However, in first claim the

applicant describes the first value as being cross correlation of an I component

and Q component of modulated signal. The first value or the second or the third

value can not be both. Applicant contradicts himself with first and second and

third values of in claim 1 and claim 2. For, the purpose of examination claim 1 is

examined however second claim needs clarification.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1, 4 – 8, 10 – 13, 15 - 20 are rejected under 35 U.S.C. 102(b) as

being anticipated by **Wiss (US 20020097812)**.

Regarding claim 1, a receiver for estimation and compensation of

phase imbalance or gain imbalance, the receiver utilizing a QPSK modulation

and a modulation scheme based on a complex scrambling code, the receiver

comprising:

means for estimating the phase imbalance or gain imbalance (**i.e. as**

shown in Fig. 5 and described in page 4, paragraph 58 it reblances the I and

Q component and estimates error or error functions which determines the

imbalance or estimates imbalance.) prior to symbol synchronization (**It is**

inherent to one of the ordinary skilled in the art to perform synchronization

of the rebalanced I and Q component, the synchronization can not be

performed if I and Q are imbalanced or offset) using <u>**at least one of**</u> a first

value related to a cross correlation of an I component and a Q component of an

incoming I/Q modulated signal (**i.e. in the presence of a phase imbalance, ε_ϕ**

is an average cross correlation of the I and Q channels after the rebalancer,

page 4, paragraph 54, again applicant reminded that the claim limitation

says one of those three values), a second value related to a cross correlation

of a compensated I component and a compensated Q component of the

modulated signal, and a third value related to a square of the compensated I

component and a square of the compensated Q component of the modulated

signal; and

means for compensating the I and Q components of the incoming I/Q

modulated signal to provide compensated I and Q components (**i.e. as shown in**

Fig. 5 and described in page 4, paragraph 58 it reblances the I and Q

component and estimates error or error functions which determines the

imbalance or estimates imbalance. Page 1, paragraph 16 describes the

signal is modulated) for symbol synchronization (**It is inherent to one of the**

ordinary skilled in the art to perform synchronization of the rebalanced I

and Q component, the synchronization can not be performed if I and Q are

offset, it is inherent and well know in the art to synchronized rebalanced or

compensated I and Q).

Regarding claim 4, The receiver according to claim 1, where the means for compensating the I and Q components of the incoming I/Q modulated signal includes means for compensating the phase imbalance or gain imbalance before synchronization (**as described in claim 1, again i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it reblances the I and Q component and estimates error or error functions which determines the imbalance or estimates imbalance. It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset, it is inherent and well know in the art to synchronized rebalanced or compensated I and Q**) based on **at least one first ratio** selected from the group consisting of a second ratio, a third ratio and a fourth ratio, wherein the second ratio is a ratio between a cross correlation of said I and Q components of the incoming I/Q modulated signal and a mean value of a square of the I component, wherein the third ratio is a ratio between the cross correlation of the I and Q components and a square root of a product between a mean value of the square of the I component and a mean value of a square of the Q component (**i.e. please refer to equation below page 4, paragraph 53, it is a square root of product of mean value of the square of I and square of Q, also it is being showed**

$$a = \frac{\sqrt{\langle I^2_{avg}\rangle}}{\sqrt{\langle Q^2_{avg}\rangle}}$$

below   ), and wherein the fourth ratio is a

ratio between the mean value of the square of the Q component and the mean

value of the square of the component.

Regarding claim 5, the receiver according to claim 1, wherein the receiver

comprises a WCDMA (UMTS) receiver and wherein a feed-forward scheme or a

feed- back scheme is established in the receiver (**i.e. shown in Fig. 5 it**

feedbacks the 14 and 16 to 36 and 26 again, so it is a feed-back scheme,

does not specifically disclose it is a WCDMA receiver, but since it receives

multi carrier signal it can be implemented in WCDMA (MUTS) receiver).

Regarding claim 6, The receiver according to claim 1, wherein the

estimation of the phase imbalance or gain imbalance is carried out iteratively

(**page 4, paragraph 54, Determining a iteratively will generate an error that**

is equal to the gain imbalance. In the presence of a phase imbalance,

.epsilon..sub..PHI. is an average cross correlation of the I and Q channels

after the rebalancer).

Regarding claim 7, A method for estimation and compensation of

phase imbalance or gain imbalance in a receiver utilizing a QPSK modulation

and a modulation scheme based on a complex scrambling code, the

demodulation method comprising the step of:

estimating the phase imbalance or gain imbalance of an incoming I/Q

modulated signal before symbol synchronization (**as described in claim 1,**

again i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it

reblances the I and Q component and estimates error or error functions

which determines the imbalance or estimates imbalance. It is inherent to

one of the ordinary skilled in the art to perform synchronization of the

rebalanced I and Q component, the synchronization can not be performed

if I and Q are offset, it is inherent and well know in the art to synchronized

rebalanced or compensated I and Q) using <u>at least one</u> of a first value related

to a cross correlation of an I component and a Q component of the modulated

signal, a second value related to a cross correlation of a compensated I

component and a compensated Q component of the modulated signal, and a

third value related to a square of the compensated I component and a

square of the compensated Q component of the modulated signal (**i.e. in the**

presence of a phase imbalance, ε_Φ is an average cross correlation of the I

and Q channels after the rebalancer, page 4, paragraph 54); and

compensating the phase imbalance or gain imbalance on the basis of the

at least one first ratio such that a feed-forward scheme or a feed-back scheme is

established (**i.e. as shown in Fig. 5, the corrected output of 14 and 18 which**

is being fed back to the system again so it does the process repeatedly or

iteratively, as described in page 4, paragraph 58, since it feed backs data, it

is considered fee-back scheme); and

wherein providing estimated and compensated I and Q components of the

incoming I/Q modulated signal are provided for symbol synchronization (**i.e. as**

shown in Fig. 5 and described in page 4, paragraph 58 it reblances the I and

Q component and estimates error or error functions which determines the

imbalance or estimates imbalance. It is inherent to one of the ordinary

skilled in the art to perform synchronization of the rebalanced I and Q

component, the synchronization can not be performed if I and Q are offset,

it is inherent and well know in the art to synchronized rebalanced or

compensated I and Q).

Regarding claim 8, there are substantially same limitations as claim 4, thus the

same rejection is applicable.

Regarding claim 10, there are substantially same limitations as claim 6, thus the

same rejection is applicable.

Regarding claim 11, there are substantially same limitations as claim 7, thus the

same rejection is applicable.

Regarding claim 12, A method, comprising:

iteratively compensating a phase imbalance or gain imbalance in a

receiver (**i.e. as shown in Fig. 5, the corrected output of 14 and 18 which is**

being fed back to the system again so it does the process repeatedly or

iteratively, It reblances the phase and gain imbalance as described in page

4, paragraph 58, also page 3, paragraph 54 discloses the process is done

iteratively), the receiver utilizing a QPSK modulation and a modulation scheme

based on a complex scrambling code, of the iteratively compensating including

(**i.e. It is a further object of this invention to provide such compensation**

which requires no tone insertion, and is independent of the modulation

employed by the system, page 1, paragraph 16, So regardless of any

modulation scheme it will be able to perform the steps of method below):

a) determining an error function (**i.e. the error function are considered**

output of 34 and output of 24 of Fig. 5, as described in the application the

error function is just a multiplication of corrected I and Q function,

paragraph 14 of specification) on the basis of samples of phase compensated

in- phase components and quadrature components of a revived I/Q modulated

signal (**as shown in Fig. 5 the receiver receives the I (in-phase) and Q**

(Quadrature-phase) component, as shown in the figure it is being fed in to

the A/D converter so it samples the I and Q component of the received

signal, please refer to Fig. 5);

b) filtering the error function (**i.e. the output of 34 and 24 is being fed**

into the normalized function 36 and 26, as described in page 4, paragraph

59 They account for signal level fluctuations into the receiver. These

functions have the effect of ensuring constant adaptation behavior

regardless of input signal level. For a given system these blocks may be

set to a constant less than unity, so it is a filtering function);

c) integrating the filtered error function (**i.e. as shown in Fig. 5,**

component 40 integrates the output of the normalize function 36 and 26,

The output of 28 is then digitally integrated by a register 30, The output of

38 is then digitally integrated by a register 40, page 4, paragraph 58);

d) determining a modified error function by adding the integrated (**i.e. as**

shown in Fig. 5, the normalized (36 and 26 of Fig. 5) and integrated (40 and

30 of Fig. 5)) and filtered error function (**i.e. the output of the normalize**

function 36 and 26 of Fig. 5) to a product of the integrated and filtered error

function and a parameter based on speed and stability (**i.e. as shown in Fig. 5**

the normalized (output of 36 and 26) is being multiplied with a parameter μ_Φ

at 38 and then being added at step 42 with the integrated step 40 function,

page 4, paragraph 58, as described the abstract an initial set of

convergence parameters can be applied to speed-up the start of

convergence, and a second set of smaller values can be applied some time

later for more precise convergence);

e) determining a corrected output signal of the I/Q components of the received

signal on the basis of subsequent samples of phase compensated in-phase

components and quadrature components of the received I/Q modulated signal

and the modified error function (**i.e. the output of the 14 and 18 is rebalanced**

as described in page 4, paragraph 58, again as described above the I and Q

are being sampled by A/D 10 and 12 of Fig. 5 and it is subsequent as shown

in page 2 and 3, paragraph 39, also the received signal is modulated and

the modified error function is the output of 40 as described above in step

d);

f) returning to step a (**i.e. as shown in Fig. 5 the output is being fed back to**

the normalize function 36 and 26 again so it repeats step a again); and

  providing estimated and compensated I and Q components of the

received I/Q modulated signal to a symbol synchronizer for synchronization (**i.e.**

as shown in Fig. 5 and described in page 4, paragraph 58 it reblances the I

and Q component and estimates error. It is inherent to one of the ordinary

skilled in the art to perform synchronization of the rebalanced I and Q

component, the synchronization can not be performed if I and Q are offset).

Regarding claim 13, A method, comprising:

  iteratively compensating a phase imbalance or gain imbalance in a

receiver (**i.e. as shown in Fig. 5, the corrected output of 14 and 18 which is**

being fed back to the system again so it does the process repeatedly or

iteratively, It reblances the phase and gain imbalance as described in page

4, paragraph 58), the receiver utilizing a QPSK modulation and a modulation

scheme based on a complex scrambling code, of the iteratively compensating

including (**i.e. It is a further object of this invention to provide such**

compensation which requires no tone insertion, and is independent of the

modulation employed by the system, and the adaptive performance of

which is excellent even at low SNR, page 1, paragraph 16, So regardless of

any modulation scheme it will be able to perform the steps of method

below):

a) determining an error function (**i.e. the error function are considered**

output of 34 and output of 24 of Fig. 5, as described in the application the

error function is just a multiplication of corrected I and Q function,

paragraph 14 of specification) on the basis of samples of phase compensated

in- phase components and quadrature components of a revived I/Q modulated

signal (**as shown in Fig. 5 the receiver receives the I (in-phase) and Q**

(Quadrature-phase) component, as shown in the figure it is being fed in to

the A/D converter so it samples the I and Q component of the received

signal, please refer to Fig. 5);

b) filtering the error function (**i.e. the output of 34 and 24 is being fed**

into the normalized function 36 and 26, as described in page 4, paragraph

59 They account for signal level fluctuations into the receiver. These

functions have the effect of ensuring constant adaptation behavior

regardless of input signal level. For a given system these blocks may be

set to a constant less than unity, so it is a filtering function);

c) integrating the filtered error function (**i.e. as shown in Fig. 5,**

component 40 integrates the output of the normalize function 36 and 26,

The output of 28 is then digitally integrated by a register 30, The output of

38 is then digitally integrated by a register 40, page 4, paragraph 58);

d) determining a modified error function by adding the integrated (**i.e. as**

shown in Fig. 5, the normalized (36 and 26 of Fig. 5) and integrated (40 and

30 of Fig. 5)) and filtered error function (**i.e. the output of the normalize**

function 36 and 26 of Fig. 5) to a product of the integrated and filtered error

function and a parameter based on speed and stability (**i.e. as shown in Fig. 5**

the normalized (output of 36 and 26) is being multiplied with a parameter μ_Φ

at 38 and then being added at step 42 with the integrated step 40 function,

page 4, paragraph 58, as described the abstract an initial set of

convergence parameters can be applied to speed-up the start of

convergence, and a second set of smaller values can be applied some time

later for more precise convergence);

e) determining a gain on the basis of a product of the modified error

function and a factor (**i.e. the digitized I component is then amplified, i.e.,**

multiplied by a circuit 14 having a variable coefficient C.sub.0, the

coefficient being a function of a gain imbalance loop described below, the

output of circuit 14 being a rebalanced I. The digitized I component is also

multiplied by a circuit 16 having a variable coefficient C.sub.1, the

coefficient being a function of a phase imbalance loop described below,

page 4, paragraph 58);

f) determining a corrected output signal of the I/Q components of the

received signal on the basis of subsequent samples of phase compensated in-

phase components and quadrature components of the received I/Q modulated

signal and the modified error function (**i.e. the output of the 14 and 18 is**

rebalanced as described in page 4, paragraph 58, again as described above

the I and Q are being sampled by A/D 10 and 12 of Fig. 5 and it is

subsequent as shown in page 2 and 3, paragraph 39, also the received

signal is modulated and the modified error function is the output of 40 as

described above in step d);

g) returning to step a (**i.e. as shown in Fig. 5 the output is being fed**

back to the normalize function 36 and 26 again so it repeats step a again);

and

providing estimated and compensated I and Q components of the received I/Q

modulated signal to a symbol synchronizer for synchronization (**i.e. as shown in**

Fig. 5 and described in page 4, paragraph 58 it reblances the I and Q

component and estimates error. It is inherent to one of the ordinary skilled

in the art to perform synchronization of the rebalanced I and Q component,

the synchronization can not be performed if I and Q are offset).

Regarding claim 15, there are substantially same limitations as claim 5, thus the

same rejection is applicable.

Regarding claim 16, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Regarding claim 17, there are substantially same limitations as claim 2, thus the same rejection is applicable.

Regarding claim 18, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Regarding claim 19, there are substantially same limitations as claim 2, thus the same rejection is applicable.

Regarding claim 20, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

8.   Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over **Wiss**

(US 20020097812) in further view of **Richards et al. US (6,289,048)**.

Regarding claim 2, Wiss teaches normalization function which is considered as

filtering of the signal. (**i.e. the output of 34 and 24 is being fed into the**

normalized function 36 and 26, as described in page 4, paragraph 59 They

account for signal level fluctuations into the receiver. These functions have

the effect of ensuring constant adaptation behavior regardless of input

signal level. For a given system these blocks may be set to a constant less

than unity, so it is a filtering function). However does not specifically disclose

that the filter is a low-pass filter.

Richards teaches a low pass filter for low pass filtering the signal (**i.e. 118**

– 124 of Fig. 3).

It would have been an obvious matter of design choice to one skilled in the

art at the time the invention was made to use low-pass filter as provided by the

inventor since applicant has not disclosed that this solves any stated problem or

is anything more than hardware choice. A person of ordinary skill in the art would find obvious for the purpose of filtering unwanted noise. In re Dailey and Eilers, 149 USPQ 47 (1966) see MPEP 2144.04.

9.   Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over **Wiss (US 20020097812)** in further view of Cochran (US 6,442,217).

Regarding claim 14, Wiss teaches the receiver according to claim 1, however does not specifically disclose comprising means for symbol synchronization which receives the estimated and compensated I and Q components and performs synchronization of the components.

Cochran teaches means for symbol synchronization which receives the estimated and compensated I and Q components and performs synchronization of the components **(i.e. a communication system (10) includes a transmitter (12) which induces in a communication signal (16), a first component of in-phase to quadrature phase (I-Q) imbalance and a receiver (14) which adds a second component of I-Q imbalance. A digital, intermediate frequency (IF) I-Q balancer (38) <u>compensates</u> for the receiver-induced <u>I</u>-Q <u>imbalance</u> so that total distortion is sufficiently diminished and a data directed carrier tracking loop (60) may then perform carrier <u>synchronization</u> to generate a baseband signal (70), abstract)**.

It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to combine the teachings of Wiss with Cochran.

One would be motivated to combine these teachings because in doing so it will provide synchronized output which is desired in communication system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANMAY K. SHAH whose telephone number is (571)270-3624. The examiner can normally be reached on Mon-Thu (7:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TANMAY K SHAH/
Examiner, Art Unit 2611

/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611